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(d) a means connected to such computer for communicating a signal representative of such pressure determined by said program to a pressure control valve disposed in fluid communication with such brake cylinders and maintaining a maximum pressure on such brake cylinders that will stop such train consist in a shortest possible distance while simultaneously substantially preventing wheel slide.

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17. (Amended) An apparatus for substantially achieving a minimum stopping distance of a train consist, according to claim 11, wherein said speed sensing means is disposed on at least one freight car.

Claims 1 and 11 have been amended to include the limitation that the velocity dependence of wheel to rail adhesion is used in determining the maximum pressure to be applied to the brake cylinders that will stop the train consist in a shortest possible distance while simultaneously substantially preventing wheel slide. This limitation was cited in original claim 4. Claim 17 is being amended to correct a grammatical error therein. No new matter has been added.

Arguments

As stated in the Amendment dated January 25, 2001, both claims 1 and 11 are specifically directed to a method and apparatus for

achieving a minimum stopping distance of a ***freight train consist***. The claims also specifically require that the ***rail to wheel adhesion*** is a significant factor in achieving this minimum stopping distance and that significant detrimental wheel slide should be avoided. The claims are being amended to more specifically state that the velocity dependence of wheel to rail adhesion must be considered when determining the maximum pressure to be applied to the brake cylinders to stop the train consist.

In the Final Office Action, the Examiner maintains the rejection of claims 1 and 11 as being ***anticipated*** by Cook et al. The Applicant disagrees with this rejection as Cook et al is directed to a brake energy balancing system for magnetic levitation trains-see col. 1, lines 26+ and col. 2, lines 17-19. Cook et al fails to state (as required under 35 USC 102(b)) or even suggest (as required under 35 USC 103(a)) that the brake energy balancing system disclosed therein could be converted for use with a freight train consist.

In response to this argument, the Examiner states: "The argument that Cook et al. would not be used with a freight car consist because it is used on a mag-lev train does not hold any weight with the examiner". The Examiner also states "From the Cook et al. disclosure the examiner find {sic} it hard to believe that it would not be used on a freight train consist, especially considering that Cook et al. discusses fully loaded, half loaded,

and empty cars".

While the above comments by the Examiner may indicate that he believes the invention is "obvious" over Cook et al., these comments certainly do not support the position that the invention is "anticipated" by Cook et al. Cook et al. includes no reference whatsoever to a freight train consist nor to the use of rails upon which the train runs upon or "brakes" upon. It is Applicant's position that the present invention is not anticipated nor is it rendered obvious by the teachings of Cook et al.

Claim 1 specifically recites in subparagraphs (a) and (c) that a computer is disposed on a freight locomotive. Subparagraph (d) of claim 1 requires maximum adhesion between wheels being braked and rail surfaces in contact with the wheels. Claim 11 includes similar limitations to a freight train locomotive and/or freight car in subparagraphs (a), (b), and (c). These limitations recited in the claims are clearly not taught by Cook et al. as required under 35 USC 102(b).

Furthermore, since the mag-lev train of Cook et al. does not run along a rail as does the present invention, Cook et al makes no reference to the use of velocity dependence of wheel to rail adhesion when determining the maximum amount of pressure to be applied to the brake cylinders to achieve stopping of the train while preventing wheel slide with respect to the rails. This is a significant element when determining the maximum amount of pressure

to be applied to the brake cylinders. The present application discusses the importance of this element throughout the specification-see pages 11, 16-17 and charts 1-7.

The Examiner's attention is also directed to page 16, lines 10-17 of the specification which discuss the need to minimize variation in wheel temperatures and the need to avoid sliding any one wheel or wheel set along the rails. None of these above discussed factors are considered in Cook et al. because the mag-lev train of Cook et al. does not run or brake along a rail.

In the "Response to Arguments" section of the Final Office Action, the Examiner also states that "Cook et al discloses a braking system that balances the brake forces on the wheel when the train is braking and is no longer levitating". While this may be true, the mag-lev train of Cook et al. does not brake while the train is running along a rail, but rather is similar to an airplane touching down on a runway, i.e. a planar surface. The Examiner's attention is directed to col. 4, lines 30+ of the reference which discuss the use of a signal indicating whether or not a wheel is locked during touchdown of the wheels and providing a hydroplaning detection signal to guard against hydroplaning of a wheel on touchdown at high speeds. Thus, it is not seen by Applicant how the teachings of Cook et al. can be concerned with the rail to wheel adhesion and minimizing wheel slide during braking as required by the claims when the train does not run along, nor is it

braked while running along a rail.

Accordingly, the Examiner is respectfully requested to withdraw the final rejection of claims 1-3, 5-8, 11 and 16-17 under 35 USC 102(b) as Cook et al. fail to anticipate each and every limitation of the claims.

As to the rejection of claim 4 (canceled via the present amendment), the Examiner cites Jordan, Jr. as teaching the coefficient of friction to maintain maximum brake pressure as shown in Figure 1. It is Applicant's position that the teachings of Jordan, Jr. do not render the limitation of the use of "the velocity dependence of wheel to rail adhesion for determining the maximum pressure to be applied to the brake cylinders that will stop the train consist in a shortest possible distance while simultaneously substantially preventing wheel slide" as being obvious. Jordan, Jr. et al teach monitoring rail conditions (wet, dry, etc.) to control the generator of the locomotive to output the appropriate power for the maximum coefficient of friction. Thus, Jordan, Jr. is concerned with a traction control system for the train while ***the train is moving***.

As to the various rejections of claims 9-10, 12-15 and 18-20 under 35 USC 103(a), since these rejections are based upon Cook as the primary reference, it is requested that these rejections be withdrawn for the reasons stated above. One having ordinary skill in the art would not be motivated to modify a reference directed to

a magnetic levitation train to arrive at a method and apparatus for substantially achieving a minimum stopping distance of a freight train consist without incurring any significant detrimental wheel slide as recited in the claims.

Accordingly, Applicant respectfully requests withdrawal of the various 35 USC 103(a) rejections over claims 9-10, 12-15 and 18-20 as Cook et al neither alone nor in combination with the cited references fails to render these claims obvious.

In view of the foregoing arguments and amendments, Applicant believes that the application meets all applicable statutory and regulatory requirements. Accordingly, Applicant respectfully requests entrance of the above amendment and allowance of all claims remaining in the application. If the Examiner has any questions regarding this amendment and/or believes that a telephone interview would assist in the advancement of this case to allowance, he/she is invited to contact the undersigned Agent for Applicant.

Respectfully submitted,

Michele K. Yoder

Michele K. Yoder
Reg. No. 41,562
Agent for applicant

James Ray & Associates
2640 Pitcairn Road
Monroeville, PA 15146-3309

Telephone (412) 380-0725
Facsimile (412) 380-0748

Appendix A

1. (Amended) A method of substantially achieving a minimum stopping distance of a freight train consist without incurring any significant detrimental wheel slide, said method comprising the steps of:

(a) preprogramming preselected information into a computer disposed on a freight locomotive <u>including velocity dependence of wheel to rail adhesion</u>;

(b) determining a speed of such freight train consist;

(c) communicating a signal that is indicative of said speed determined in step (b) to such computer disposed on such freight locomotive;

(d) determining in such computer a pressure that can be applied to brake cylinders which will maintain substantially maximum adhesion between wheels being braked and rail surfaces in contact with such wheels;

(e) communicating a signal representative of such pressure determined in step (d) to a pressure control valve in fluid communication with such brake cylinders; and

(f) <u>using said velocity dependence of wheel to rail adhesion in</u> maintaining a maximum pressure on such brake cylinders that will stop such train consist in a shortest possible distance while simultaneously substantially preventing wheel slide.

Delete Claim 4.

11. (Amended) An apparatus for substantially achieving a minimum stopping distance of a freight train consist without incurring any significant detrimental wheel slide, said apparatus comprising:

(a) a program having preselected information <u>including velocity dependence of wheel to rail adhesion</u> disposed in a computer disposed on a freight locomotive;

(b) a speed sensing means disposed on at least one of such locomotive and a freight car for determining a speed of such freight train consist;

(c) a means connected to said speed sensing means for communicating a signal that is indicative of said speed to such computer disposed on such freight locomotive, so that such program can determine a pressure that can be applied to brake cylinders which will maintain substantially maximum adhesion between wheels being braked and rail surfaces in contact with such wheels; and

(d) a means connected to such computer for communicating a signal representative of such pressure determined by said program to a pressure control valve disposed in fluid communication with such brake cylinders and maintaining a maximum pressure on such brake cylinders that will stop such train consist in a shortest possible distance while simultaneously substantially preventing wheel slide.

17. (Amended) An apparatus for substantially achieving a minimum stopping distance of a train consist, according to claim 11, wherein said speed sensing means is disposed on at least one freight car.